AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claim 1 (Currently Amended): Method for ~~the~~ an automatic determination of ~~selected~~ physical, technical method and/or colloidal chemistry parameters ~~(for example, the grain size, the distribution of grain sizes, the speed distribution, the particle flux, the hindrance function and indices of structural stability)~~ by ~~means of~~ the a determination of ~~the~~ an attenuation of radiated waves during ~~the~~ a segregation of monodisperse or polydisperse dispersion samples subjected to gravitation or centrifugation, ~~characterised by the following features~~ comprising:

(a) during the segregation by ~~means of~~ centrifugation or gravitation, repeatedly determining and recording ~~the~~ momentary transmission values $I_T(t, r)$ ~~characterising the~~ characterizing a current segregation status of the waves radiated with ~~the~~ intensity values $I_o(t, r)$ and/or ~~the~~ instantaneous scattering values $I_S(t, r)$ as a function of ~~the~~ a position r within the samples ~~is repeatedly determined and recorded at high resolution~~ at ~~any arbitrary~~ a time t, for one or more wavelengths over the entire length of ~~the~~ each sample or in selected partial sections of [[it]] each sample, simultaneously for multiple ~~and even concentrated~~ samples; ~~with known and/or unknown physical and colloidal chemistry properties.~~

(b) ~~the~~ calculating an extinction profile $E_T(t, r)$ ~~is calculated~~ by finding ~~the~~ a log of ~~the~~ a ratio of $I_o(t, r) / I_T(t, r)$ for ~~the~~ a determination of ~~the~~ a particle or droplet

concentration for the ~~tested~~ dispersion samples as a function of sample position and time; [[.]]

(c)   from ~~these~~ the extinction profiles $E_T(t, r)$ determined at different times ~~(t1 ... tn)~~ and ~~the~~ a local adjustment made in ~~these~~ time segments ~~(t(n-1)—t(n))~~, calculating segregation speeds ~~are calculated~~ for any constant extinction values; [[.]]

(d)   from ~~the~~ a ratio of the segregation speeds determined for specific extinction percentiles, calculating a polydispersity index ~~is calculated~~, which is characteristic for the polydispersity of the density or ~~the~~ a particle or droplet size; [[.]]

(e)   optionally, calculating extinction-weighted distributions of the ~~grain~~ particle or droplet size ~~are calculated~~ from extinction profiles $E_T(t, r)$ for selectable times ~~according to Equation A~~ while ~~standardising~~ standardizing on the maximum extinction for this profile; [[.]]

~~the local and temporal change of the particle or droplet concentration can be determined by taking into account the substance-specific extinction-concentration relationship.~~

~~the substance-specific extinction–concentration relationship is calculated through the simultaneous segregation of samples of the substance system to be measured with known, varying volume concentrations, whereby the concentration effect on the extinction is calculated while taking into account the repeated scattering, for example according to Equation B~~

~~and/or~~

(f)   optionally, calculating the cumulative volume-weighted distributions of the ~~grain~~ particle or droplet size ~~are calculated according to Equations A and C~~ from any extinction profiles acquired at time t according to (b) ~~1.2~~, wherein ~~whereby~~

(1)   the volume-specific extinction cross section that is dependent on particle size ~~and that is required for doing so~~ is calculated according to Mie-theory while including the device constants from ~~the~~ known optical ~~substance~~ parameters of the samples, or

(2)   ~~as an alternative to 1.8.1, the method allows the experimental determination of~~ the volume-specific extinction cross section that is dependent on particle size is determined if the extinction of at least two monodisperse reference samples is determined corresponding to (b) ~~1.2~~, or

(3)   ~~as an alternative to 1.8.1, the method allows the experimental determination of~~ the volume-specific extinction cross section that is dependent on particle size is determined if the course of the extinction is determined during the segregation of at least one polydisperse substance system with similar optical characteristics corresponding to (b); ~~1.2~~

~~and/or~~

(g)   optionally, using the volume-weighted distribution of particle or droplet sizes determined in (f) and ~~1.8,~~ the particle size dependency for the volume-specific extinction cross section determined in ~~1.8.1—1.8.3~~ (f)(1), (f)(2) or (f)(3), ~~and the concentration-dependent extinction determined in item 1.6,~~ assigning each radial position and the particle size associated with it ~~via Equation A is assigned~~ a volume concentration; ~~corresponding to Equation D~~

~~and/or~~

(h)   optionally, determining the flux density function standardized ~~standardised~~ to the centrifugation constant ~~(Equation F) is determined~~ from the change in the concentration of the samples with known starting concentration; ~~and/or~~

(i)   optionally, determining the concentration-dependent hindrance function for the substance system; ~~is determined corresponding to Equations E, E* and F~~ ~~and/or~~

(j)   optionally, determining the volume-weighted distribution of the Stokes equivalent diameter for the case of hindrance functions not equal to 1 ~~is determined by iteratively repeating Equation G instead of Equation A for the steps described in 1.2 through 1.11~~ until the difference between the concentration profiles of consecutive steps are less than a value to be provided in advance, or if the allowance for the hydrodynamic impediment ~~(Equation E)~~ is provided by ~~means of another suitable~~ a mathematical algorithm~~, for example via the definition of a cost function~~.

Claim 2 (Currently Amended): Method according to claim 1, wherein ~~the determination of~~ the ~~grain~~ particle or droplet sizes and their distribution ~~is possible for dispersed particles~~ are determined ~~with density both greater as well as less than that of the dispersion medium~~.

Claim 3 (Currently Amended): Method according to claim 1, comprising determining ~~wherein in place of the position-dependent extinction profile $E_T(t, r)$ at time t,~~ the extinction profile ~~is determined~~ as a function at a freely selectable position

or over a range (r + δr) of the sample, and the distribution of ~~grain~~ <u>particle or droplet</u> sizes is calculated from <u>the extinction profile</u> ~~it analogously to the above calculation~~.

Claim 4 (Currently Amended): Method according to claim 1, ~~wherein~~ <u>comprising calculating</u> the apparent relative viscosity ~~can be calculated~~ as a function of the concentration by volume from the hindrance function, taking into account the concentration by volume.

Claim 5 (Currently Amended): Method according to claim 1, ~~wherein~~ <u>comprising determining</u> the sedimentation type and the critical concentration by volume for the use of consolidation phenomena ~~can be determined~~ from the change in the segregation speed during the segregation.

Claim 6 (Currently Amended): Method according to claim 1, ~~wherein~~ <u>comprising increasing</u> the ascertainable range of the <u>particle or droplet size</u> distribution ~~of sizes~~ as well as the resolution with respect to the distribution of ~~grain~~ <u>particle or droplet</u> sizes ~~can be increased~~ by varying the number of revolutions and the measurement time intervals.

Claim 7 (Currently Amended): Method according to claim 1 wherein the mass density distribution of the sample is calculated from the extinction profile $E_T(t, r)$ for a known distribution of ~~grain~~ <u>particle</u> sizes.

Claim 8 (Currently Amended): Method according to claim 1 wherein for mixtures of substances of different densities, the distribution of ~~grain~~ particle or droplet sizes for the individual substance components is calculated from the extinction profiles for the segregation of dispersions with different densities for the dispersion medium.

Claim 9 (Currently Amended): Method according to claim 1, ~~wherein~~ comprising computing indices for the consolidation behavior of the dispersion samples ~~can be computed~~ from the sediment levels for gradually changed revolutions related to the respective operative centrifugal force.

Claim 10 (Currently Amended): Method according to claim 1 wherein the control of the segregation analyzer ~~analyser~~ and the measurement sensor, including radiation source, sample management and data transfer, data handling and data storage, as well as all steps of analysis and the documentation of the results, takes place by ~~means of~~ software supported by a database.

Claim 11 (Currently Amended): Device for ~~the~~ an automatic determination of ~~selected~~ physical, technical method and/or colloidal chemistry parameters, comprising ~~(for example, the grain size, the distribution of grain sizes, the speed distribution, the particle flux, the hindrance function and indices of structural stability),~~ ~~consisting of~~ a PC-controlled multi-sample receptacle unit arranged vertically or horizontally with a spectrometric measurement device with a source producing monochromatic parallel radiation, which registers, digitizes ~~digitises~~ and stores the

radiation intensity scattered or transmitted by the respective dispersion sample over the entire length of the sample simultaneously or shifted temporally during ~~the~~ segregation, resolved for location and time.

Claim 12 (Currently Amended): Device according to claim 11, wherein different cuvettes matched to the measurement task and/or the dispersion sample with respect to the optical path length and the materials can be used, the cuvette type is detected automatically, and the parameters required for the analysis of the measurement results are automatically made available via database entries for the calculation of the parameters to be <u>analyzed</u> ~~analysed~~.

Claim 13 (Previously Presented): Device according to claim 11 wherein radiation sources of different monochromatic wavelengths, whose radiation intensity $I_o(t, r)$ can be varied, are also used electively in an alternating fashion, depending on the sample and measurement tasks.

Claim 14 (Currently Amended): Device according to claim 11 wherein ~~the~~ <u>a</u> measurement range can be controlled by thermostat and ~~the~~ measurements can be carried out at selectable temperatures both under as well as over room temperature.

Claim 15 (Previously Presented): Device according to claim 11 wherein the multi-sample receptacle unit is designed as a rotor, and is driven by a motor with programmable variable and/or constant revolutions.

Claim 16 (Currently Amended): Device according to claim 11, ~~has a~~ wherein the multi-sample receptacle unit~~, which makes possible the acceptance of~~ is capable of accepting samples placed vertically for segregation in the gravitational field.

Claim 17 (New): Method according to claim 1, wherein the physical, technical method and/or colloidal chemistry parameter that is determined is selected from the group consisting of particle size, distribution of particle size, speed distribution, particle flux, hindrance function, index of structural stability and a combination thereof.

Claim 18 (New): Method for an automatic determination of physical, technical method and/or colloidal chemistry parameters by a determination of an attenuation of radiated waves during a segregation of monodisperse or polydisperse dispersion samples subjected to gravitation or centrifugation, comprising, during the segregation by centrifugation or gravitation, repeatedly determining and recording momentary transmission values $I_T(t, r)$ characterizing a current segregation status of the waves radiated with intensity values $I_0(t, r)$ and/or instantaneous scattering values $I_S(t, r)$ as a function of a position r within the samples at a time t, for one or more wavelengths over the entire length of each sample or in selected partial sections of each sample, simultaneously for multiple samples.

Claim 19 (New): Method according to claim 18, further comprising calculating an extinction profile $E_T(t, r)$ by finding a log of a ratio of $I_0(t, r) / I_T(t, r)$ for a

determination of a particle or droplet concentration for the dispersion samples as a function of sample position and time.

Claim 20 (New): Method according to claim 18, further comprising, from the extinction profiles $E_T(t, r)$ determined at different times and a local adjustment made in time segments, calculating segregation speeds for any constant extinction values.